

Environmental Performance Surface for Support Underwater Laser Imaging Systems & Diver Operations



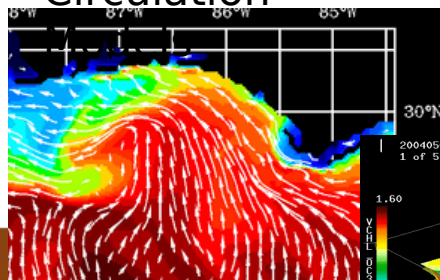
R. Arnone, S. Ladner, A. Weidemann
Stennis Space Center, MS

Proposed support to Vulcan Ex March 2011

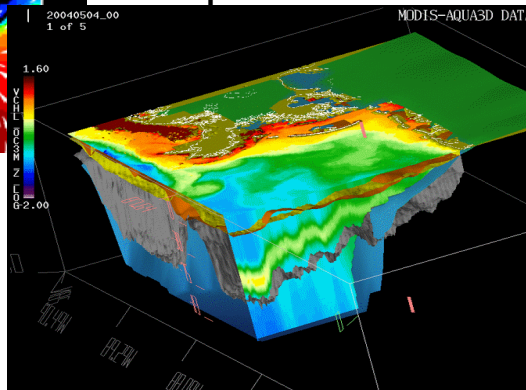
Environmental characterization for the Northern Gulf of Mexico

- a) Forecasting the Optical Environment ✉ Impact on systems (ASQ 24) and Diver visibility
- b) Vertical optical layers
- c) daily and 24 hour forecast of the EOIDS performance

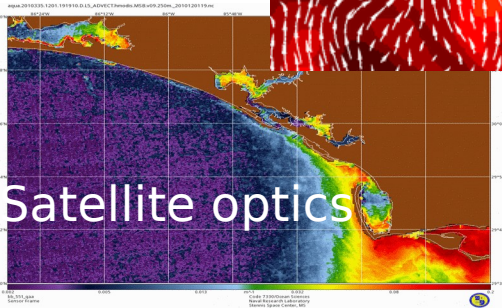
Circulation



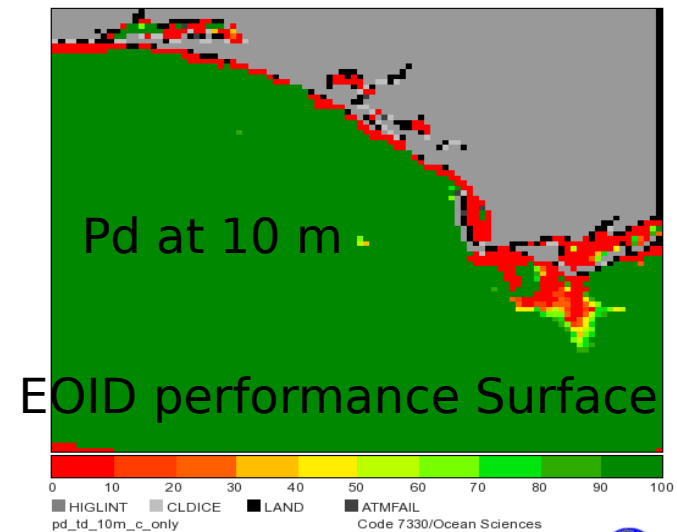
3d optical volume



Satellite optics



UNCLASSIFIED
S2005016181757.L3_HNAV_PAN Sun Jan 16 18:23:05 2005





Satellite ocean color Imagery from provides real time monitoring of the optical properties in the Gulf

aqua.2010348.1214.184500.D.L3.hmodis.MSB.v06.250m.hdf

Total backscatter at 555 nm, QAA algorithm v5

Tue Dec 14 18:48:33 2010

Northern Gulf of Mexico

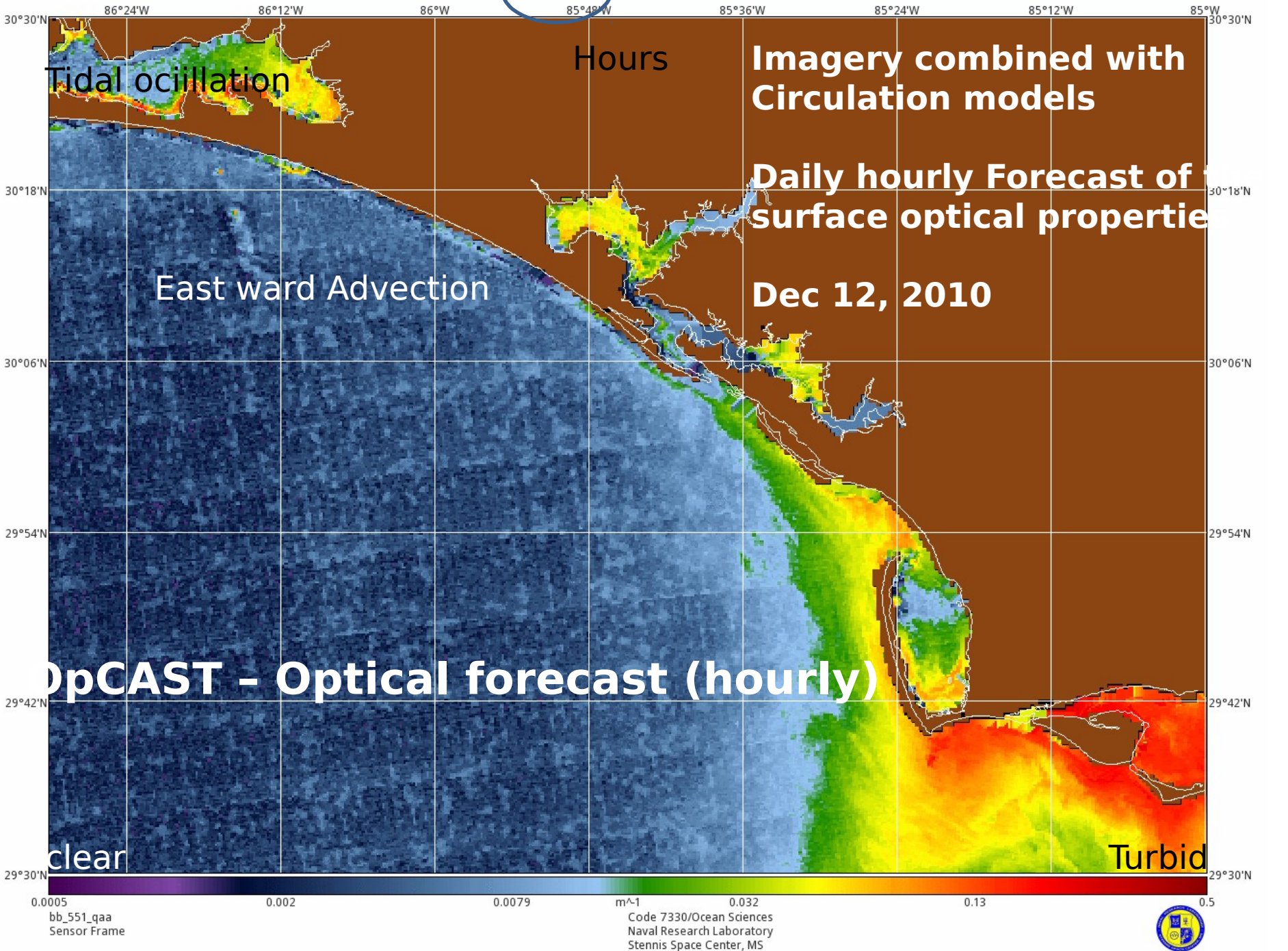
MODIS Aqua - 250m Resolution - T
December 14, 2010 1845 GMT

Panama City, FL

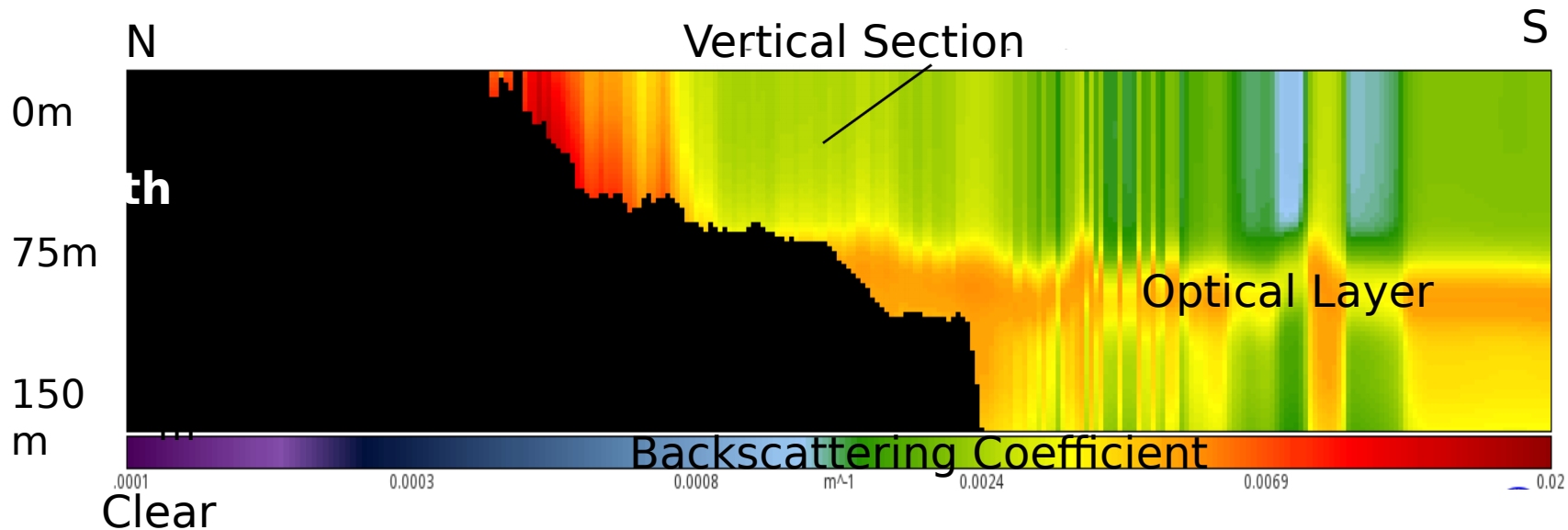
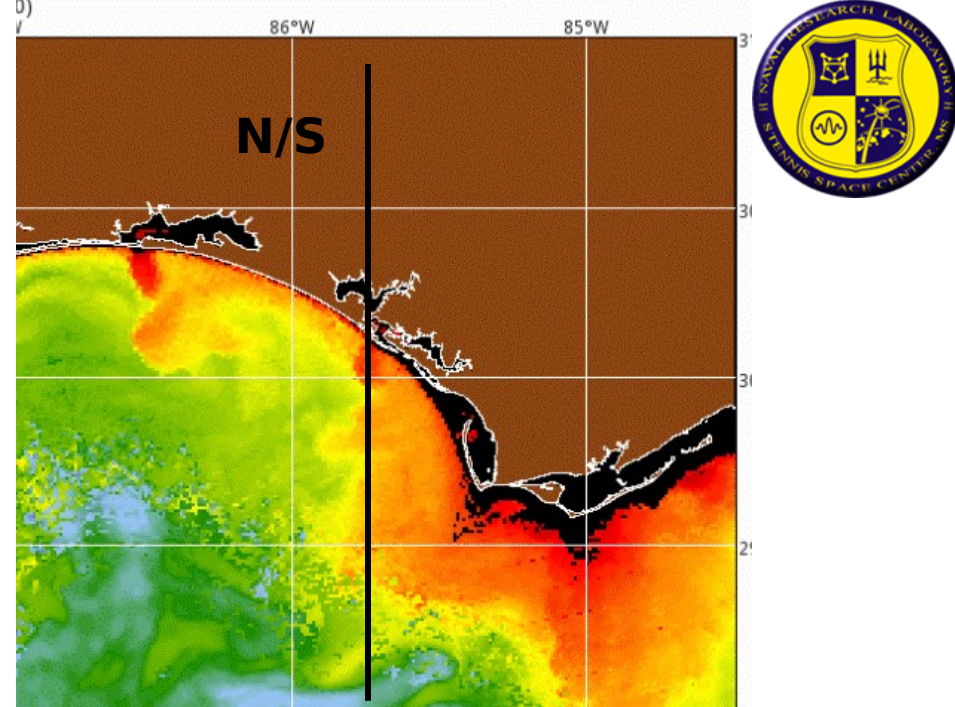
Surface turbidity
Beam attenuation Coefficient

0.0005 0.002 0.0079 0.032 0.13 0.5
CLDICE LAND ATMFIL
bb_555_qaa (provisional)
Mississippi Bright (MODIS-AQUA-PM)
Version 9 (APS v3.8.2.1)

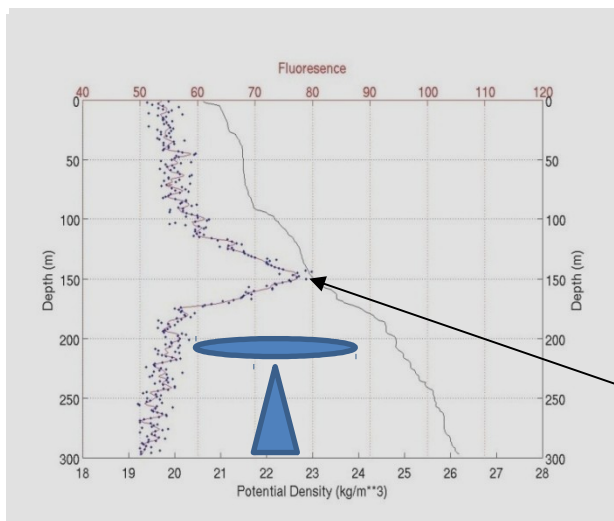
Code 7330 Ocean Sciences
Naval Research Laboratory
Stennis Space Center, MS



**Optical Volume
Created by
Merging
Satellite, models and
Insitu data “
Surface to Bottom
Animation
(Black Areas are Bottom)”**



Integration of 3d volume to System performance



**EODES
Profile Point
Performance**



**Tow Below
Optical Layer**

Profile's Point \
performance



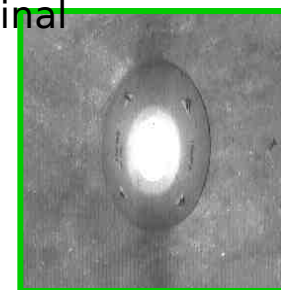
No Go



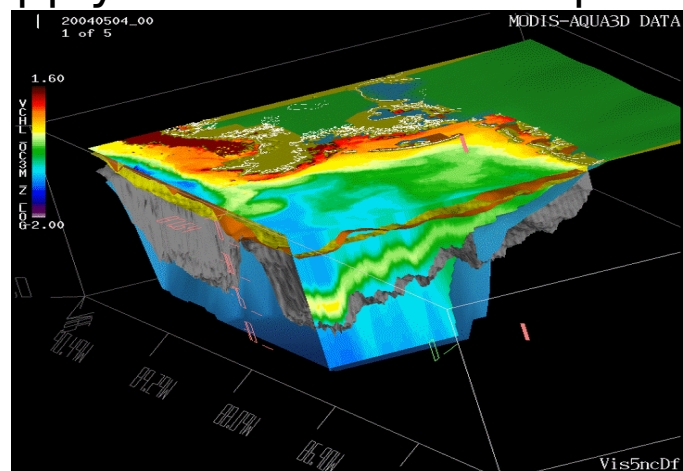
Marginal



Go



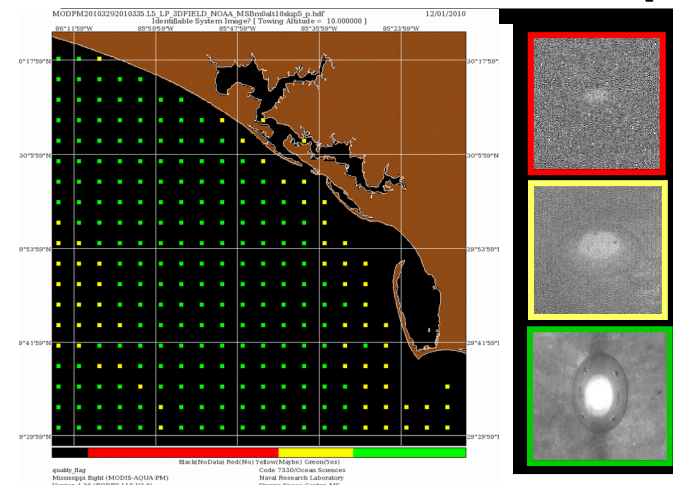
Extend vertical Glider profiles spatially
Apply EODEs to the 3d optical Volume



**EODES Spatial
Performance**

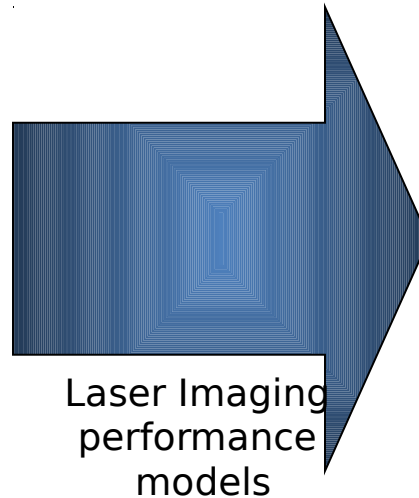
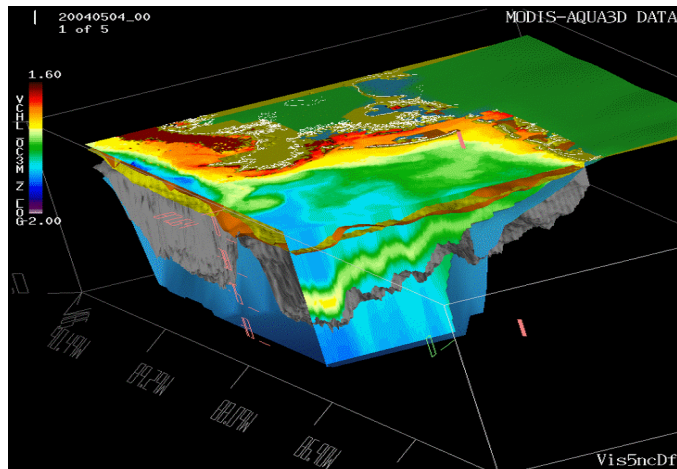


Performance Surface map

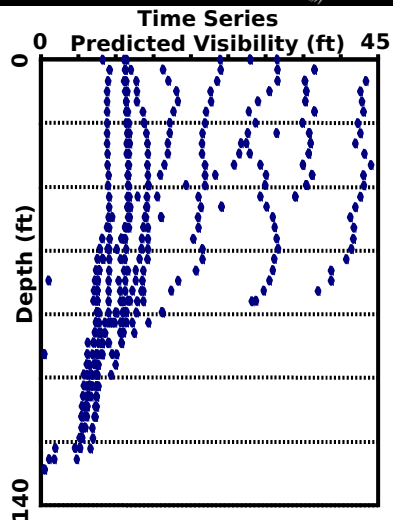


Performance Fields

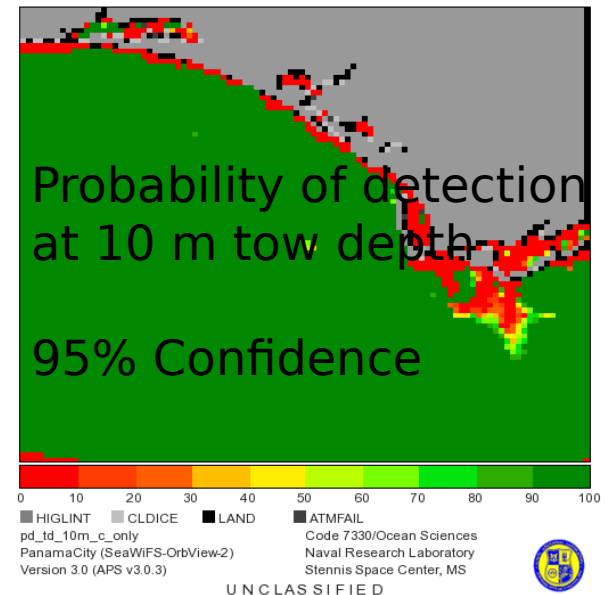
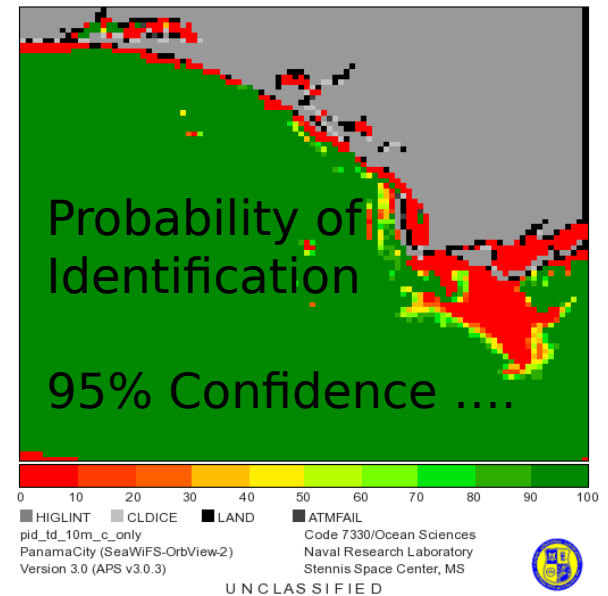
Battlespace Characterization 3d optical profiles



Laser Line Scanner



Vertical Optical profile



Data Requested for NRL participation



- **Satellite data**



- **Ocean Models**



- **Vertical Optical Profiles**

- **BSP (transmissometer)**



- **Slocum Gliders**

- (**attenuation meter**)



- **Laser Line scan Image Snipits**



Required	Requested 1	Requested 2	
a			Satellite data stream in place
a			Data stream in place
			Profiles use for: tuning optical Volume & validation
	a		
		a	
		a	Images used for validation